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(54) Abstract Title
A brain alarm device to detect electrical changes at the onset of a seizure

(57) This invention monitors brain activity and sets off an alarm when preset parameters are breached. The programme is designed to recognise onset of epilepsies or drowsy state. The device can be portable or static. Scalp electrodes detect electrical changes in the brain which indicate the onset of a seizure. Information about the effect of drugs may also be obtained.

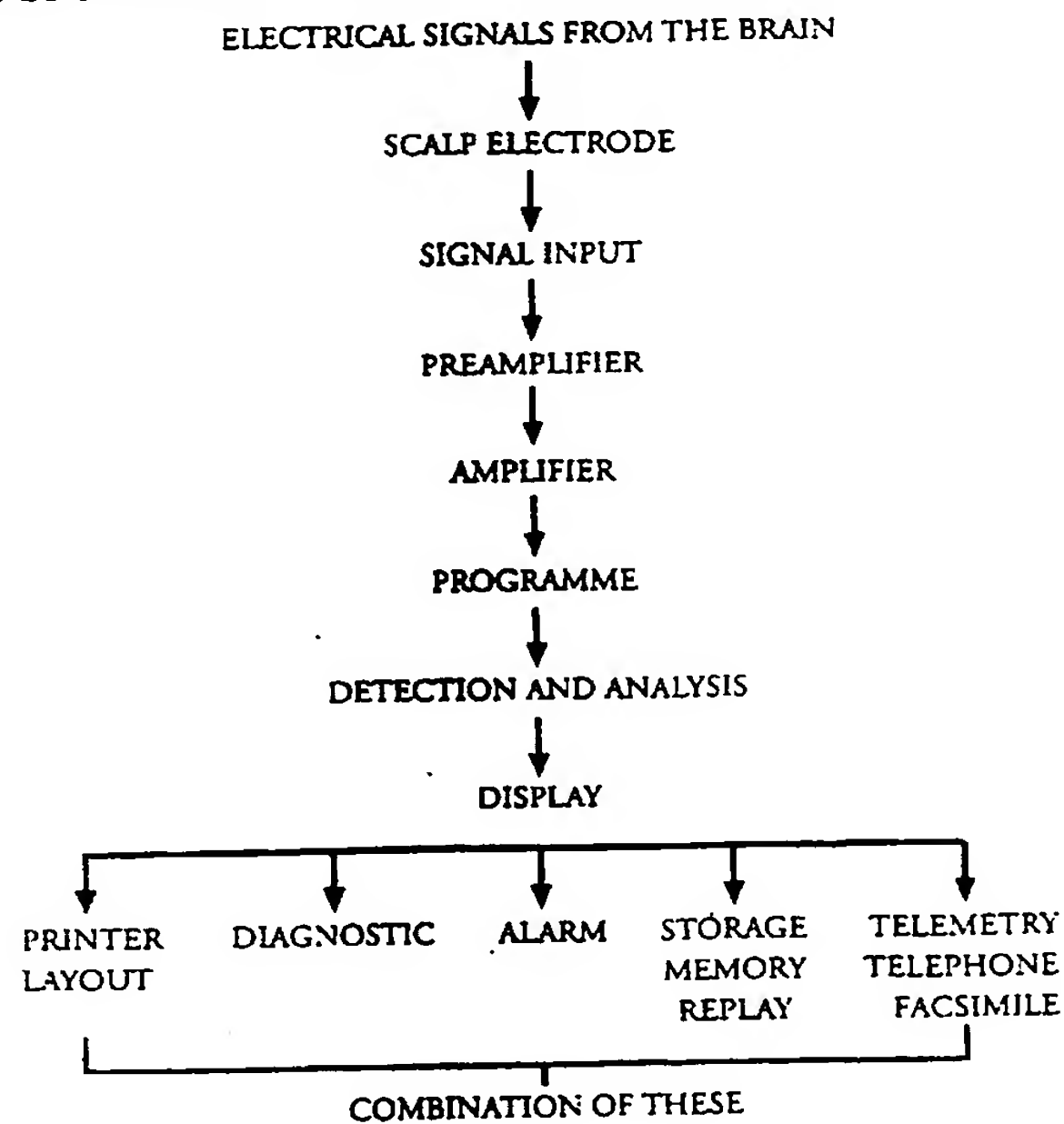


fig. 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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BRAIN MONITOR

This invention relates to monitoring of brain activity and alarm devices.

5 Various brain disorders are characterised by changes in electrical activity; the readings are known as electroencephalogram (EEG). There are definite changes associated with altered brain states causing drowsiness and disease. These changes can be detected by continuously monitoring individuals in hospital or elsewhere. At present there are alarm devices for
10 breathing related disease:- Apnoea Alarm and for heart rate - Cardiac Monitor.

According to the present invention, there is provided apparatus for monitoring brain activity, the apparatus comprising a plurality of
15 electrodes disposed adjacent to the scalp and a processing unit, the apparatus provides electrical impulses being attenuated before reaching the scalp, the processing unit comprising a preamplifier and an amplifier being such that the electrodes feed these signals into the preamplifier and the amplifier where the signals are magnified.

20

Preferably the apparatus comprises three electrodes.

Preferably the electrical impulses are in the order of microvolts

25 Preferably the electrodes are placed on the surface of the scalp.

Preferably the apparatus comprises a filter used to screen background noise and electrical interference. Preferably one of the electrodes detects the

pulse rate. Preferably the apparatus compresses a programme which is designed to detect the following changes-

1. Amplitude
2. Frequency
- 5 3. Duration of the Changes

It will be appreciated that the individual parameters are altered to meet the function for which the alarm is used.

- 10 The present invention will now be described by way of example only with reference to the accompanying figures in which:

In Figure 1 a flow chart describes how signals fed into the alarm are processed and the outcome channelled,

15

In Figure 2 the electrodes placed on the forehead and a microprocessor incorporated into a headgear is used to detect electrical changes that accompany drowsy states,

- 20 In Figure 3, three electrodes, one transfers and two temporal areas of scalp are used to detect seizures of generalised nature and absence seizures, and

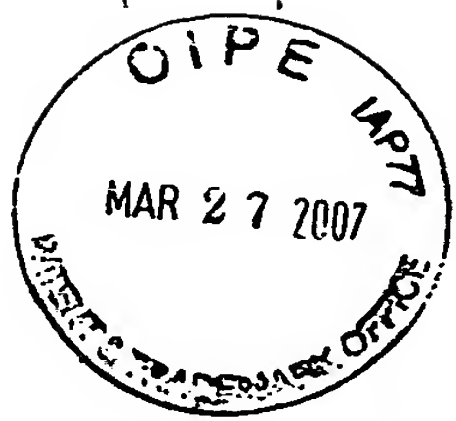
In Figure 4, the function of the monitor in Intensive Care Unit setting of a hospital is shown.

25

The electrode placements are varied depending on the EEG tracings obtained from conventional paper or computerised versions of the equipment's used for this purpose.

CLAIMS

1. A brain alarm device to detect the electrical changes at the onset and during seizures by placement of electrodes at appropriate area of the scalp where the seizure had been shown to originate by the EEG recording.
- 5 2. A brain alarm device which alerts drivers of vehicles, pilots and operators of machinery by virtue of detection of rapid eye, movements and slowing of electrical activity in the frontal area.
- 10 3. A brain alarm device as claimed in claim 1 above, detects seizure activity of the brain and thereby provides information on response to drug treatment with anti-seizure medication.
- 15 4. A brain alarm device as claimed in claim 1 and claim 3 above, provides information on the control of seizure activity in patients with epilepsy and therefore useful in comparing the efficacy of one medication and compare with another.
- 20 5. A brain alarm as claimed in claim 1 and claim 3 above, detects seizure activity in a patient in Intensive Care or Special Care Baby Unit and thereby alerts nurses and doctors of its presence in an unconscious patient.
- 25 6. A brain alarm as claimed in 1 and 3 above, wherein seizure activity is detected and response to treatment is known gives guidance in school as to the relationship between seizures and lack of concentration. It is useful in showing the effect seizures have in a child's education by denoting the frequency and providing a correlation between seizures and inattention and thereby provide an explanation for learning difficulties.



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ELECTRICAL SIGNALS FROM THE BRAIN



SCALP ELECTRODE



SIGNAL INPUT



PREAMPLIFIER



AMPLIFIER



PROGRAMME



DETECTION AND ANALYSIS



DISPLAY



PRINTER
LAYOUT

DIAGNOSTIC

ALARM

STORAGE
MEMORY
REPLAY

TELEMETRY
TELEPHONE
FACSIMILE

COMBINATION OF THESE

fig. 1

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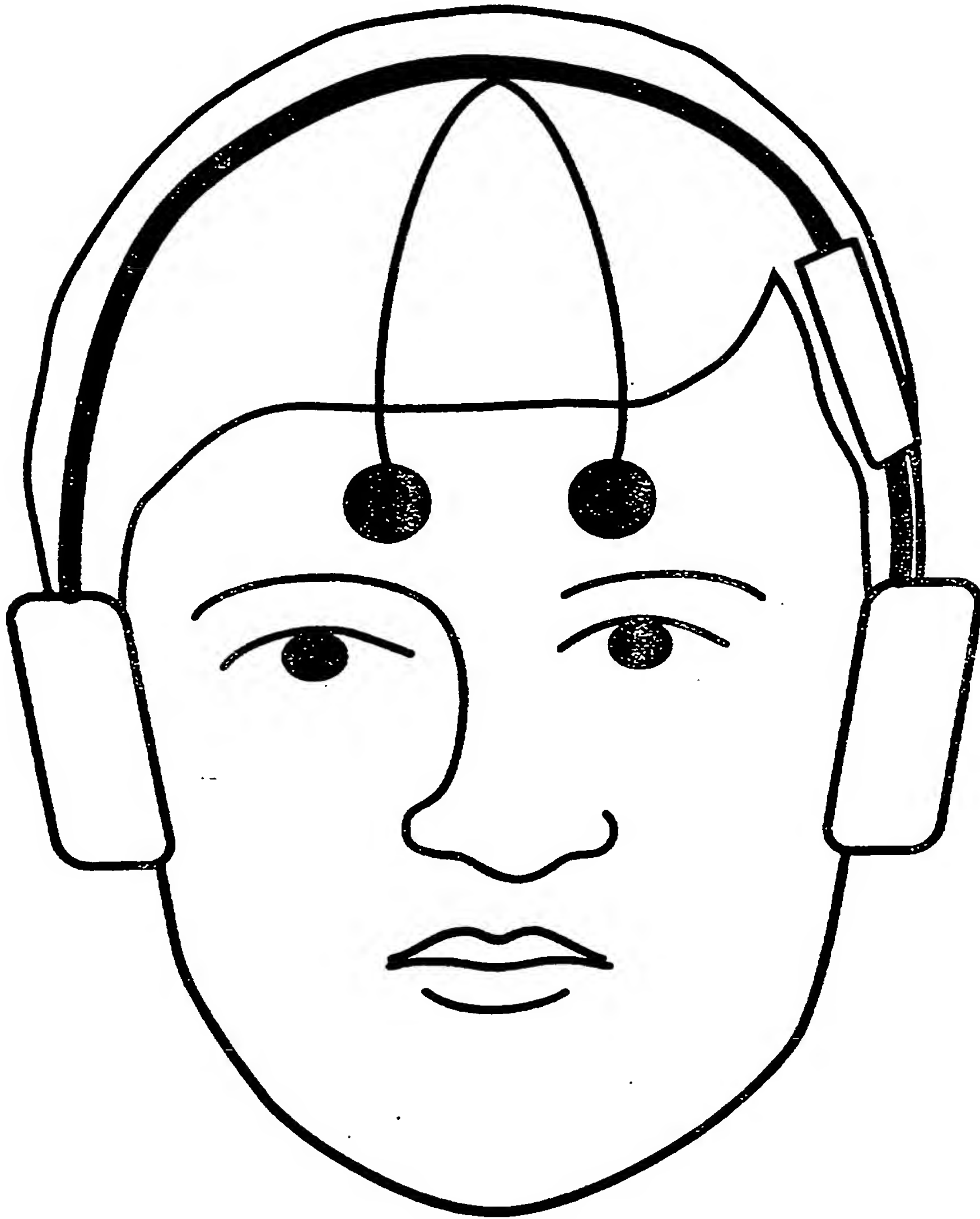


fig. 2

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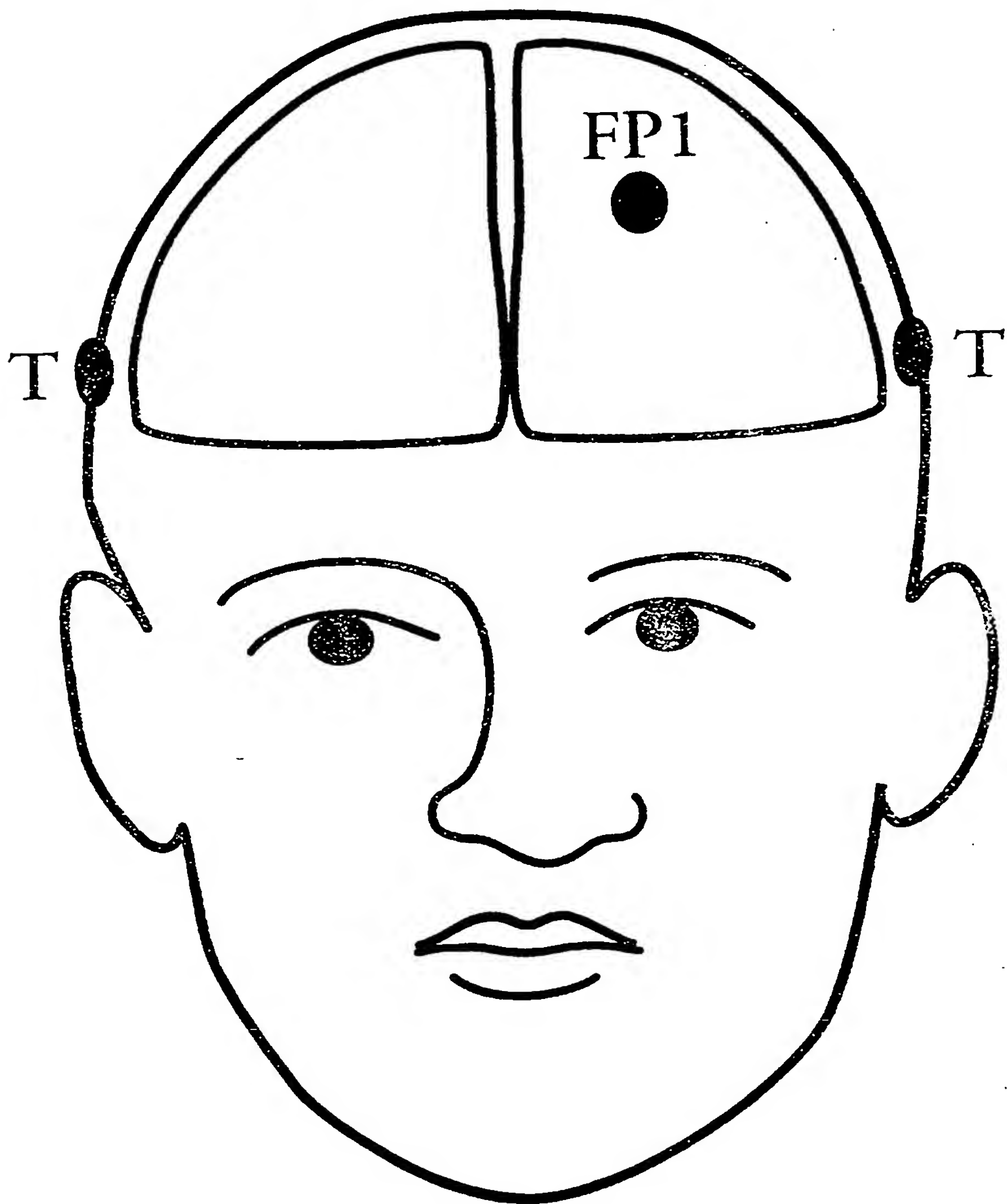


fig. 3A

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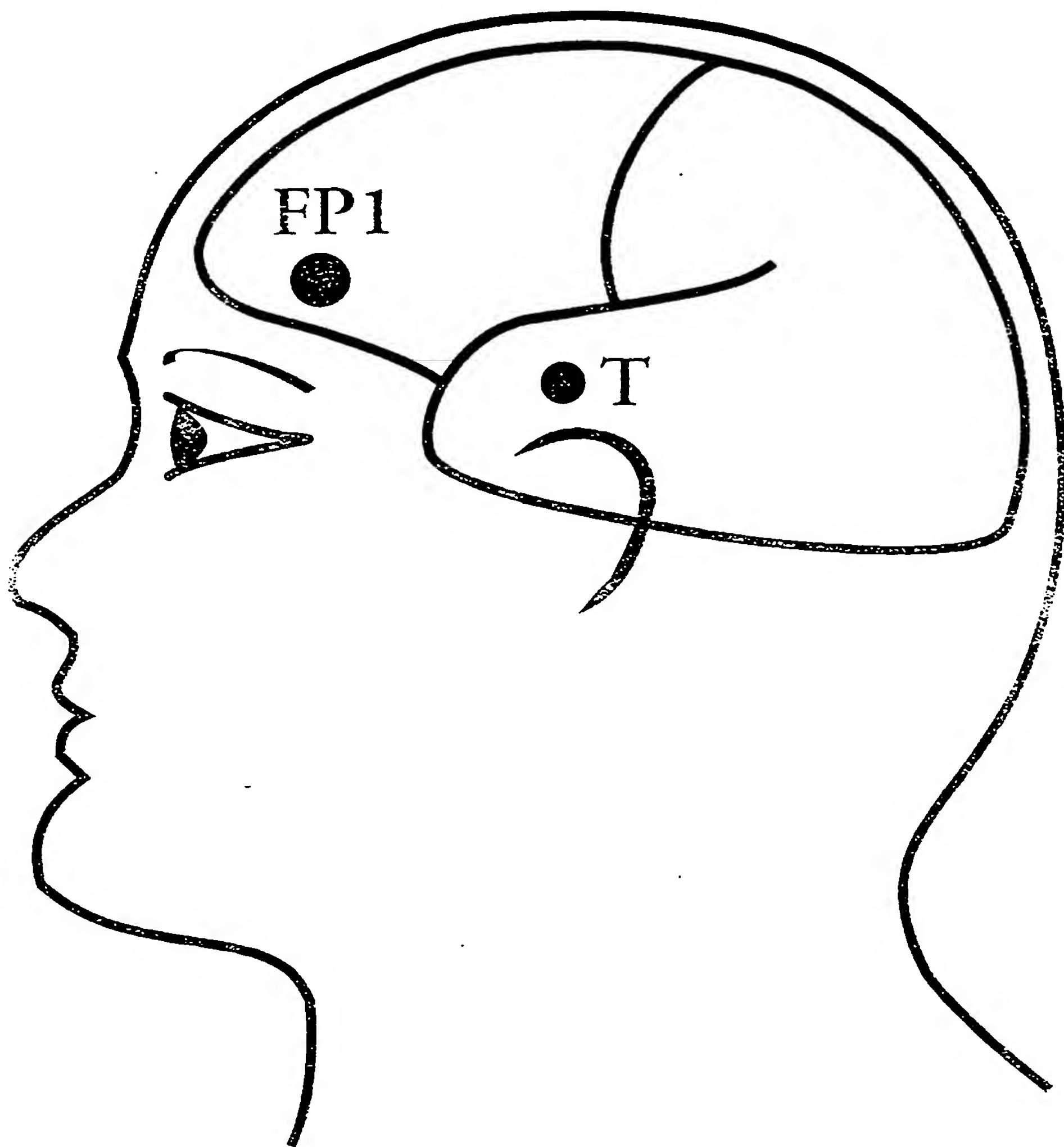


fig. 3B

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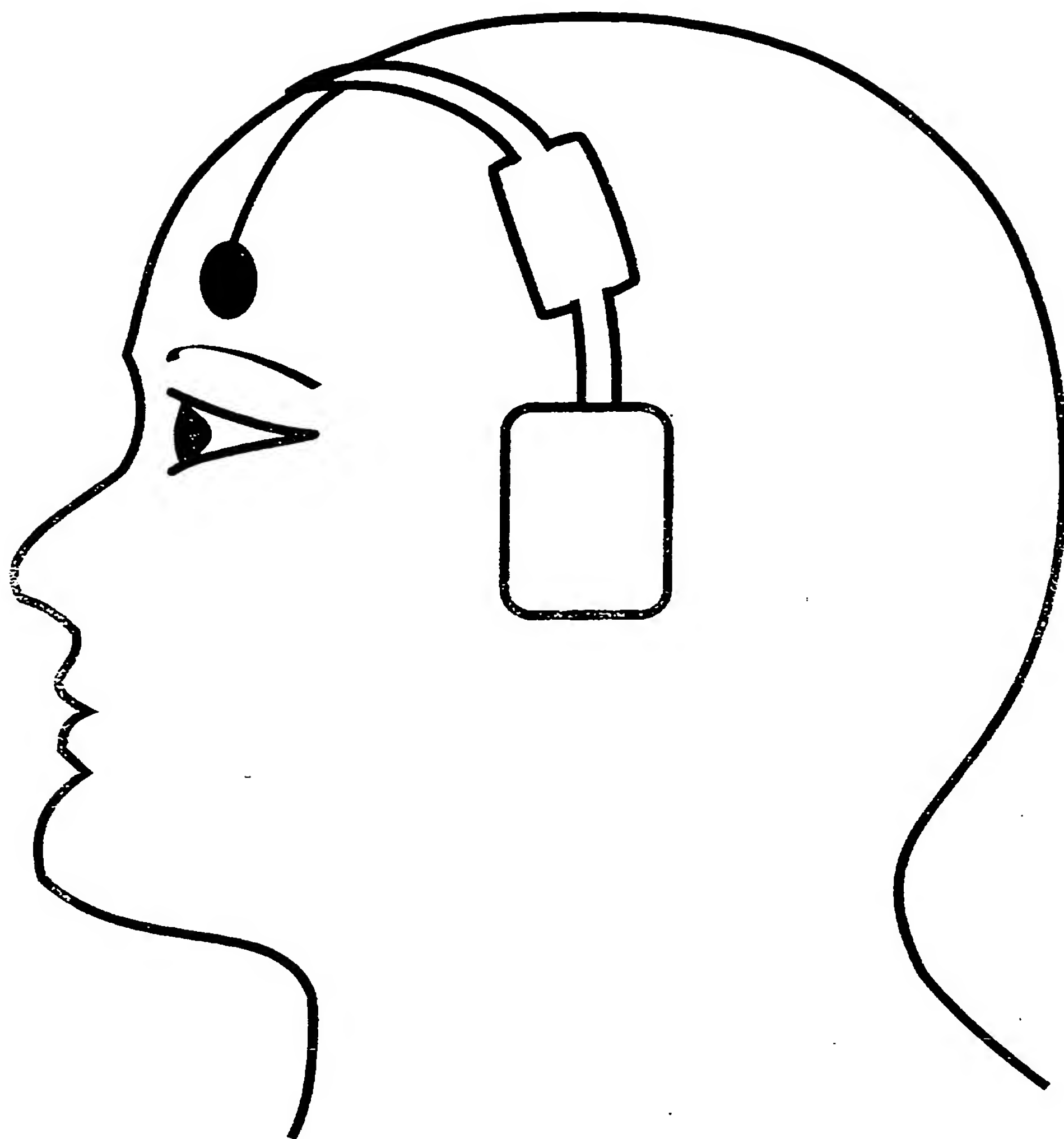


fig. 4